INTRODUCTION

The Bridger Plant Materials Center (MTPMC) develops solutions to emerging conservation concerns through the release of new plant germplasm and the development of new technologies (e.g. row spacing, alternate row, planting equipment, etc.) for growing plants. Off-center field plantings are an important part of this work. Field plantings test new plant selections or establishment technologies under a variety of soil, climate, and land uses. Their purpose is to assess the conservation potential of new plant selections and technologies under actual use conditions. For scientists at the MTPMC, field plantings are final evaluations of proposed and selected germplasm, or for technology development. For conservation planners, field plantings are a way to test new plant species releases and technologies in their service areas. Producers, through field plantings, can test plants and technologies on a small scale before investing in large scale planting. Information from field plantings is used to support plant releases, provide guidance to conservation planners in the Field Office Technical Guide (FOTG), and are used as educational demonstrations.
Field plantings always have an objective related to one or more conservation practices including pasture, hayland, rangeland or wildlife habitat improvement, soil stabilization, critical area stabilization (Figure 1), saline demonstration, pollinator demonstration, or others. The objective of a planting may simply be to compare the performance of a new plant release to a common variety, compare drill seeding to broadcast seeding, or evaluating various types of seedbed preparations. Alternately, field plantings can be complex studies involving many cooperators with treatments, controls, and multiple species in a replicated design. They should be large enough for a producer to install with a drill, generally one to two acres per variety seeded, but are generally not larger than 5 acres. Species may also be seeded to small plots for demonstrations or studies testing multiple varieties of numerous species (Figure 2).

Figure 2. A field planting with replicated plots of individual grass or forb species to test their adaptation and performance for restoring wildlife habitat.

Initiating a field planting can happen in several ways. Producers, conservation planners, Area or State Office staff can all initiate a field planting. The type of field planting will depend on their objectives. The following are examples. A producer can go to a Field Office and request a field planting to test how alternate-row seeding might increase forage production. A conservation planner in a Field Office may solicit an interested producer to plant a field border with a newly released wildflower species to determine if it grows successfully and can be incorporated into a pollinator seed mix for the service area. An Area Office may be faced with a special initiative to remove an invasive species but lacks the technology to re-establish wildlife habitat after the use of a persistent herbicide. The State Office may be inundated with requests for variances to use a newly released species to increase forage production on saline sites but lacks performance data comparing it to a standard variety.

Field plantings are the responsibility of the Plant Materials Specialist (PMS) who, with the help of the MTPMC Manager and the State Plant Materials Committees, makes sure the field planting meets the state's needs assessment. The PMS maintains a register of all field plantings by state. Data from field planting evaluations are sent to the PMS who maintains the data in a database.
The database is used to write field plantings reports, provide guidance to the Field Offices, update the FOTG, and for other technology transfer products.

PROCEDURE

Field Planting Plan

There is significant latitude in how a field planting is “put on-the-ground”, but there are a few procedural requirements to ensure efficiency, quality, and record keeping (Figure 3). The field planting plan is the first step and is developed in the Field Office in cooperation with a landowner, producer, or other cooperator. Field planting plan development can start at any time during the year. However, each fall the PMS releases a bulletin requesting field planting plans for consideration.

The plan is recorded on a NRCS-ECS-9 form found on the plant materials website under “Plant Materials Forms” (Appendix A). It is important cooperators fully understand from the start their responsibilities of providing a test site, thoroughly preparing the site, procuring plant materials, seeding, fencing, and allowing evaluations over the life of the planting (which can be as long as 10 to 15 years). This form is reviewed with and signed by the cooperator. It is also important to include soil, precipitation, Major Land Resource Area (MLRA) and Ecological Site Descriptions (ESD) information on the form. This document, along with ‘Planting and Site Information’ forms, is the basis of the database record, is used in plant release documentation, and used to develop seeding recommendations. The site history for the previous three years is important to estimate the scope of the potential weed seed bank, if persistent herbicides were applied that may affect the species to be seeded, or other factors affecting the outcome of the planting.

The field office submits the signed plan, along with supporting documents, to the area representative of the Plant Materials Committee, in most cases this is the Area Range Conservationist who reviews the plan. After Area Office approval, the plan is forwarded to the PMS. The PMS reviews the plan with the PMC Manager to ensure needed resources are available and the proposal is compatible with the Plant Materials Needs Assessment. After passing review, the plan goes before the State Plant Materials Committee for final approval. At any time during this process, changes to the plan can be recommended to the originating Field Office and approved by the cooperator. Once the plan has been approved by the committee, the Field Office creates a file with the NRCS-ESC-9 form. The file maintains records for the life of the planting, including the completed planting, site information form, and evaluation forms.

Approval

The Montana and Wyoming Plant Materials Committees meet annually to, among other things, review field planting plans. Each representative presents plans from their area to the committee. Following discussion, there is a vote for approval. Approval is based on the justification that the planting is needed and meets the objectives of the Needs Assessment, and there is enough detail in the methods to support success. For the representative to “sell” the planting to the committee, it is important to involve the representative in the planning process. It is difficult for the representative to make a convincing presentation if they receive the plan at the last minute. Some Areas prefer internal review before sending the plan to the Plant Materials Committee. If the plan is not approved, the reasons are detailed, and the DC and cooperator can decide whether to amend and resubmit the plan, or abandon it. It is better to scrap an inadequate plan at this point than to invest the time, effort, and expense of putting in a planting that is likely to fail.
Acquiring Seed and Woody Plant Stock

The plant materials prescribed in the plan are either provided by the PMC or purchased by the cooperator. In general, the PMC provides seed of new or potential plant releases that need testing, whereas the cooperator purchases seed of commercially available industry standards for comparison. Sometimes the PMC can provide all seed for a planting depending on seed availability at Bridger PMC or the PMS can request seed from other PMCs in our region. Most woody planting stock will need to be purchased by the cooperator. However, woody planting stock is occasionally available from a PMC. The PMS arranges for plant materials provided to be shipped to the Field Office.

Equipment

Nearly all field plantings require farming equipment for their installation. In general, the cooperator provides all seedbed preparation, seeding implements, and a tractor to pull and power the
equipment. The most common exception to this rule is a drill or seeder. Many Conservation Districts own a drill seeder and make it available to cooperators in their district to rent or borrow. The PMC has drills and a plot seeder, and depending on budget and personnel constraints, can contribute this equipment, and an operator, to install the planting. Some field plantings will require a precision plot seeder, which the MTPMC may provide. For woody plantings, a bare-root seedling planter may be required. Such details must be addressed in the planning process and approved at the Plant Materials Committee Meeting.

![Figure 4. A producer-prepared disced seedbed for a winterfat/forage kochia field planting in Montana with the objective of improving winter forage. This field planting tested the effect of harrowing, discing, discing and rolling, and no seedbed preparation treatments on seeded species establishment.](image)

**Site Preparations**

Once a plan is approved, the cooperator prepares the site for planting as detailed in the plan unless otherwise arranged during the planning process (Figure 4). This includes seedbed preparation, weed control, fencing, and any fertilizer, irrigation, or other cultural practices required in the plan.

Thorough seedbed preparation for both herbaceous and woody plantings cannot be stressed enough. A poor seedbed is the most common cause of seeding failure. Unless otherwise detailed in the plan, the seedbed should be firm and weed-free. “Weed free” can be more complex than just spraying or tilling out of existing weeds just prior to planting. Weed populations include not only visible plants but also seeds stored in the soil (seed bank) that may not be visible. This is one reason why site history data are so important. If the site has a history of unmanaged weeds, with a strong likelihood of a large seed bank, then one or more seasons of cover cropping with weed control may be needed to reduce the seed bank, or a better site selected.

Another important factor in successful establishment of a field planting is a firm seedbed. A firm seedbed facilitates proper seeding depth and good seed-to-soil contact. A seedbed is firm enough when the foot print of an adult is not more than ¼ inch deep. The soil of a firm seedbed is
pulverized and does not have large clods. There are many Technical Notes on the Montana and Wyoming Plant Materials website that provide guidance on seedbed preparation.

Installing the Planting

After the seedbed has been properly prepared, and before seeding or planting, a “Planting and Site Information” form must be completed. There are separate forms for herbaceous (Appendix B) and woody plantings (Appendix C). Forms are located on the Montana and Wyoming Plant Materials website under ‘forms’. Because seedbed quality has a significant influence on successful establishment of seedings and plantings, it is best to complete this evaluation at the time of seeding or planting. This information is important when assessing the success or failure of the planting. Copies should be filed in the Field Office, sent to area representative, and sent to the PMS. If all the details of a good plan are addressed and weather conditions are favorable, then the probability of planting success is improved.

Planting Maintenance

There is no entry on the ECS-9 form for maintenance practices after a field planting has been established. However, the need for follow-up maintenance is likely. Fences will need to be maintained where livestock and wildlife are to be excluded. Cultivation or herbicide weed control around woody plantings is recommended. Where weed fabric is used, it may require maintenance. Herbaceous field plantings may need mowing to reduce weed seed production during establishment or between-row cultivation. This should be discussed with the cooperator during planning. Demonstrations require a maintenance plan and a cooperator committed to carrying it out (Appendix D).

Figure 5. Clipping biomass to measure grass production on a replicated field planting. Replicated field plantings generally require more extensive evaluations than the information requested on the standard form.
Evaluation

Field plantings are evaluated the first growing season after planting (year one), and in years two, three, five, and 10 for herbaceous plantings, and years one, two, three, five, 10, and 15 for woody plantings. In most cases, the evaluations are conducted by the Field Office where the field planting originated. Sometimes the area representative of the Plant Materials Committee will participate in the evaluation. The PMS will participate in evaluations upon request for assistance by the Field or Area Office. The PMS sends out a bulletin requesting field planting evaluations in early-summer and sends evaluation forms for all active plantings on the register to the Field Office of origin at the same time. Evaluation forms for herbaceous (Appendix E) and woody plantings (Appendix F) are on the Montana and Wyoming Plant Materials website under “Plant Materials Forms”.

Replicated field plantings usually require density or biomass evaluations and will have more detailed data sheets than standard evaluation forms (Figure 5). Once the plantings are evaluated, completed forms or data sheets are filed in the Field Office and sent to the Area Office plant materials representative and PMS.

Figure 6. The fifth year of a field planting testing native seed mix composition testing broadcast and drill seeding for wildlife habitat improvement. Establishment of this planting was not evident until year three.

Duration

Herbaceous field plantings have target durations of 10 years whereas woody field plantings are expected to last 15 years. However, the cooperator can terminate a field planting at any time and for any reason. The most common reason for terminating a field planting is failure to establish. This information is just as important as growth and productivity over the life of a successful planting. For herbaceous plantings, it is best to allow the seeding three years to establish before considering it a
failure, particularly when seeding slow establishing native species (Figure 6). Trees and shrubs that die during a field planting can be replaced at the cooperators discretion.

**Technology Transfer of Results**

All field planting information is maintained by year in the field planting database located in the Montana State Office and maintained by the PMS. There are separate files for Montana and Wyoming, and for herbaceous and woody plantings. A record is created from the information recorded on the Field Planting Plan (ECS-9) and the Planting and Site Information form filled out at the time of seeding or planting. Climate, physiographic, edaphic, seedbed preparation, and seeding conditions will influence plant survival and performance. When site information is combined with plant performance evaluations, relationships between performance and site conditions are identified and used to improve seeding recommendations. As the PMS receives evaluation forms, the database is updated. The PMS uses the data for the development of field planting reports, Technical Notes, and presentations, and to update the FOTG. Data from replicated field plantings can be analyzed and reported in Technical Notes and journal articles, and to update the FOTG.

Field Plantings Reports and Technical Notes are located on the Montana and Wyoming Plant Materials website.
PLANTING PLAN FOR FIELD, SPECIAL AND INCREASE PLANTINGS

<table>
<thead>
<tr>
<th>No.</th>
<th>Cultivar/Release Name</th>
<th>Scientific Name or Common Name</th>
<th>Accession Number</th>
<th>Seeding or Planting Rate</th>
<th>Amount Needed</th>
<th>Supplied By</th>
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Site History Previous Three Years

20 ____________________________
20 ____________________________
20 ____________________________

Purpose of Planting

______________________________

Proposed Planting Date or Period ____________________________

Method of Planting to be Used

______________________________

Materials Needed | Rate/Acre | Notes |
<table>
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<tbody>
<tr>
<td>Lime</td>
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<td>Fertilizer</td>
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<td>Herbicide</td>
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<td>Mulch</td>
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USDA IS AN EQUAL OPPORTUNITY PROVIDER AND EMPLOYER.
PLANTING PLAN FOR FIELD, SPECIAL AND INCREASE PLANTINGS

(CONTINUED)

To Be Completed by the Assisting Conservationist

Does the cooperator understand the purpose of the planting?
Yes [ ] No [ ]

Does the cooperator understand the cultural practices needed?
Yes [ ] No [ ]

Does the site meet the requirements in the planting guide?

Is it conveniently located?
Yes [ ] No [ ]

Is site separated with a fence?
Yes [ ] No [ ]

Is it on the soil identified in the plan?
Yes [ ] No [ ]

Will the planting be grazed?

When

Has the cooperator agreed to properly manage the planting?
Yes [ ] No [ ]

Are weed control measures needed?
Yes [ ] No [ ]

Will weeds be managed?
Yes [ ] No [ ]

Will field and equipment be checked prior to planting?
Yes [ ] No [ ]

Does the cooperator need assistance with planting?
Yes [ ] No [ ]

Will NRCS personnel assist with planting?
Yes [ ] No [ ]

Will follow-up assistance be provided?

To periodically check on the planting?
Yes [ ] No [ ]

To complete required evaluations?
Yes [ ] No [ ]

Attach additional notes and instructions to this form as needed

Evaluations to be conducted:

________________________________________________________________________

________________________________________________________________________

Comments:

________________________________________________________________________

________________________________________________________________________

I understand that this planting is for research and demonstration purposes and agree to participate in the establishment, maintenance and evaluation of this planting.

Cooperator: Name/Signature Date

Submitted By: Name/Signature Date

Approved (SCD): Name/Signature Date

Approved (PM): Name/Signature Date
PLANTING PLAN FOR FIELD, SPECIAL AND INCREASE PLANTINGS
FORM INSTRUCTIONS

These instructions will assist in completing form NRCS-ECS-9.

**Planting Number**
Enter the unique number assigned by the Plant Materials Center staff or Plant Materials Specialist for this planting. The format for field plantings is identified in the National Plant Materials Manual, sections 540.14(F)(5) and 520.66. This number should correspond to a POMS database record if applicable.

**Field Office**
The name of the primary field office involved with the planting (if applicable).

**Cooperator**
The name of the land owner, individual or organization cooperating with this planting

**Phone Number**
The phone number and/or email address of the cooperator

**Address**
The address of the cooperator where the planting will occur

**State**
The state where the planting will occur

**County**
The county where the planting will occur

**MLRA**
Major Land Resource Area; enter the MLRA code of the area where the planting will occur. MLRAs can be found at [http://soils.usda.gov/survey/geography/mlra/](http://soils.usda.gov/survey/geography/mlra/)

**Township**
Township name where the planting is planned (if applicable). This is used in the Public Land Survey System (PLSS). For more information and online access to PLSS maps, go to [http://www.geocommunicator.gov/GeoComm/Isis_home/home/index.html](http://www.geocommunicator.gov/GeoComm/Isis_home/home/index.html)

**Range**
Range where the planting is planned (if applicable). This is used in the Public Land Survey System (PLSS). For more information and online access to PLSS maps, go to [http://www.geocommunicator.gov/GeoComm/Isis_home/home/index.html](http://www.geocommunicator.gov/GeoComm/Isis_home/home/index.html)

**Section**
Section where the planting is planned (if applicable). This is used in the Public Land Survey System (PLSS). For more information and online access to PLSS maps, go to [http://www.geocommunicator.gov/GeoComm/Isis_home/home/index.html](http://www.geocommunicator.gov/GeoComm/Isis_home/home/index.html)

**Latitude**
The geographic latitude of the planting location in decimal degrees or degrees, minutes, and seconds

**Longitude**
The geographic longitude of the planting location in decimal degrees or degrees, minutes, and seconds

**Location Map Provided**
A separate location map should be included with this plan. Check the box if you provided a map.

Soil
Web versions of soil survey maps can be obtained at http://soils.usda.gov/survey/online_surveys. List the soil series or soil complex at planting location

Texture
List the dominant soil texture at the planting location

Soil Modifier
List the dominant soil modifier at the planting location - if applicable

Slope
The slope at the planting location, as a percentage

Aspect
The exposure of the site; check the box(es) corresponding to the planting location exposure - N = north, S = south, E = east, W = west; more than one box may be checked

Elevation
The site elevation at the planting location. Check one box, either “ft” for feet or “m” for meters to indicate the unit of measurement represented

Annual Precipitation
Indicate the site’s mean annual precipitation. The range in precipitation assigned to the soil series or soil complex is recommended. Check one box, either “in” for inches or “mm” for millimeters to indicate the unit of measurement represented

Irrigation Available
Check “yes” or “no” to indicate if irrigation water is available for the site

Number of acres to be Planted/Seeded
Indicate the number of acres that will be planted. If less than an acre, note square feet instead.

Scientific Name/Common Name
The Latin scientific name or the common name of the plant to be used

Cultivar/Release Name
The cultivar or release name of the plant to be used, if applicable

Accession Number
The assigned accession number of the accession to be planted (example 9076517 western wheatgrass), if applicable

Seeding/Planting Rate
Indicate the seeding rate or the planting rate. For example, for seed - pounds per acre, or number of plants per acre

Amount Needed
The quantity of material necessary to complete the planting for the site (seed should be listed in PLS (pure live seed

Supplied By
The name of the PMC, individual, organization or company that will provide the planting materials
Site History Previous Three Years
20 Enter the year number; then in the space provided, describe the site’s use and/or condition for the year indicated. Enter this data for the past three years, one year per row.

Purpose of Planting
Describe the purpose of the planting

Proposed Planting Date or Period
Indicate the date or range of dates when the planting will take place

Method of Planting
Indicate how the material will be planted – drill, broadcast (hand-planted), aerial, hydro-seed, etc.

Materials Needed
Listed are the most common materials that may be required for the planting. Lime, Fertilizer, Herbicide and Mulch are identified – if these materials are recommended, indicate the quantity needed in the Rate/Acre field. In the Notes field, indicate any specific instructions, directions or methods of application. There is one additional line available to record materials needed or recommended that are not listed.

To be Completed by the Assisting Conservationist
Answer Yes or No to each question and fill in any blanks as applicable

Evaluations to be conducted
Indicate what plant parameters will be evaluated with this planting, e.g. rate of seedling emergence, rate of growth, rate of spread, mature height, flowering date, seed maturity date, seed shatter, drought tolerance, insect or disease problems, overwinter survival, etc.

Comments
Include any important comments related to the Planting Plan

Signatures
Fill in appropriate names and obtain signatures to finalize the agreement and responsibilities for planning the planting.
This page intentionally left blank.
## SEEDING AND SITE INFORMATION FOR HERBACEOUS FIELD PLANTINGS

**COOPERATOR:** ______________________  **PLANTING NUMBER:** ______________________

**FIELD OFFICE:** ______________________  **AREA:** ______________________  **EVALUATOR(S):** ______________________

**SEEDING DATE:** ______________________  **TEMP / WIND:** ______________________

**DESCRIBE ANY CHANGES TO THE NRCS-ECS-9 SEED MIX:** IF THERE ARE NO CHANGES: N/A.

<table>
<thead>
<tr>
<th>Cultivar/Release Name</th>
<th>Scientific or Common Name</th>
<th>Accession Number</th>
<th>Seeding Rate</th>
<th>Acres Seeded</th>
<th>Supplied By</th>
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**SEEDBED PREPARATION**

- ☐ Tillage
- ☐ Packing/Rolling
- ☐ Herbicide application(s)
- ☐ Other: ______________________

**NOTES:**

**WEED CANOPY COVER**

- ☐ Weed Free
- ☐ 1 – few plants
- ☐ 0 - 5%
- ☐ 6 - 25%
- ☐ 26 - 50%
- ☐ >50%

**Weed Species Present:** ______________________

**NOTES:**

**SOIL MOISTURE**

- ☐ Good
- ☐ Adequate
- ☐ Too Dry
- ☐ Too Wet

**NOTES:**

**SEEDING METHOD**

- ☐ Drill
- ☐ Alternate Row
- ☐ Cross Seeded
- ☐ Drill Row Spacing: ______________________
- ☐ Broadcast
- ☐ Broadcast and Harrow
- ☐ Aerial

**NOTES:**

**IRRIGATION**

- ☐ Pre-Seeding
- ☐ Post-Seeding
- ☐ Pre-Seeding
- ☐ Post-Seeding
- ☐ Full Season
- ☐ Limited Season
- ☐ Sub-Irrigated

**NOTES:**

**HERBICIDE APPLICATION**

- ☐ Pre-Seeding
- ☐ Post-Seeding

**Kind:** ______________________

**Rate:** ______________________

**Date Applied:** ______________________

**NOTES:**

**FERTILIZER APPLICATION**

- ☐ Pre-Seeding
- ☐ Post-Seeding

**Kind:** ______________________

**Rate:** ______________________

**Date Applied:** ______________________

**NOTES:**

**SALT PRESENCE**

- NA, 1 = concentrated salt deposits, 3 = few salts, salt tolerant plants, 5 = no visible salts

**NOTES:**
COMMENTS
(Note any changes to the seeding design and draw a map on the back if applicable. Other relevant site and condition information.)
PLANTING AND SITE INFORMATION FOR WOODY FIELD PLANTINGS

Cooperator: ________________________________ Planting Number: ________________________________

Field Office: ___________________________ Area: ___________ Evaluator(s): ___________________________

Planting Date: ___________________________ Temp / Wind: ___________________________

Describe any changes to the NRCS-ESC-9 planting plan; if there are no changes: N/A.

<table>
<thead>
<tr>
<th>Cultivar/Release Name</th>
<th>Scientific or Common Name</th>
<th>Accession Number</th>
<th>Number Planted</th>
<th>Supplied By</th>
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Site Information: Evaluate the entire planting area.

Site Preparation

☐ Tillage  ☐ Disking  ☐ Packing/Rolling  ☐ Herbicide application(s)  ☐ Mowing  ☐ Other

Other: ___________________________

Notes:

Weed Canopy Cover (percent canopy cover in planting area)

☐ Weed Free  ☐ 1 – few plants  ☐ 0 - 5%  ☐ 6 - 25%  ☐ 26 - 50%  ☐ >50%

Weed Species Present:

Notes:

Soil Moisture

☐ Good  ☐ Adequate  ☐ Too Dry  ☐ Too Wet

Notes:

Irrigation

Kind ___________________________

☐ Pre-Planting  ☐ Post-Planting

☐ Full Season  ☐ Limited Season  ☐ Sub-Irrigated

Notes:

Herbicide Application

Kind ___________________________

☐ Pre-Planting  ☐ Post-Planting

Rate ___________________________

Date Applied ___________________________

Notes:

Salt Presence

NA, 1 = concentrated salt deposits, 3 = few salts, salt tolerant plants, 5 = no visible salts

Notes:

Species Information: Complete second page.

Notes:
### Species Information

<table>
<thead>
<tr>
<th>Species</th>
<th>1.</th>
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<tr>
<td><strong>Planting Stock</strong> (Seed, Container, Bareroot, Cuttings, Grafts, Other)</td>
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<td><strong>Age of Stock</strong> (Years)</td>
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<td><strong>Height</strong> (Feet)</td>
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<td><strong>Diameter at Breast Height</strong> (DBH Inches)</td>
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<td><strong>Container Size</strong> (cubic inches or gallons)</td>
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<td><strong>Planting Method</strong> (Hand, Auger, Cone Planter, Dibble Bar, Other)</td>
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<tr>
<td><strong>Spacing within Row</strong> (Feet)</td>
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<tr>
<td><strong>Spacing Between Row</strong> (Feet)</td>
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<tr>
<td><strong>Plant Protection</strong> (Mulch, Fabric, Mats, Protector Tubes, Other)</td>
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<table>
<thead>
<tr>
<th>Species</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
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</thead>
<tbody>
<tr>
<td><strong>Planting Stock</strong> (Seed, Container, Bareroot, Cuttings, Grafts, Other)</td>
<td></td>
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<tr>
<td><strong>Age of Stock</strong> (Years)</td>
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<tr>
<td><strong>Height</strong> (Feet)</td>
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<tr>
<td><strong>Diameter at Breast Height</strong> (DBH Inches)</td>
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<tr>
<td><strong>Container Size</strong> (cubic inches or gallons)</td>
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<tr>
<td><strong>Planting Method</strong> (Hand, Auger, Cone Planter, Dibble Bar, Other)</td>
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<tr>
<td><strong>Spacing within Row</strong> (Feet)</td>
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<tr>
<td><strong>Spacing Between Row</strong> (Feet)</td>
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<tr>
<td><strong>Plant Protection</strong> (Mulch, Fabric, Mats, Protector Tubes, Other)</td>
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</tbody>
</table>
Appendix D


The following is an example of a maintenance (in good faith) plan for the life of the field or demonstration planting. It identifies the people involved and identifies what is necessary for a sustained and viable planting. The intent is to ensure the long-term maintenance of the demonstration plot or field planting.

1. Plot labels are kept upright and readable.
2. Items like loose or torn fabric are replaced or repaired in a timely manner.
3. Weeds will be controlled.
4. Demonstration Plots will be clipped annually with seed heads removed to reduce contamination of neighboring plots and to maintain plant health and vigor.
5. Livestock and vehicles will be excluded from the plot, allowing access only to foot traffic.
6. Species that do not persist or establish will be reseeded to ensure no vacant plots or strips in demonstration plantings.

As these demonstration plots and field plantings are a collaborative effort, concurrence to the maintenance plan is required. Signatures as applicable:

Cooperator: ________________________________ Date: ____________
Conservation District: ________________________________ Date: ____________
NRCS Field office: ________________________________ Date: ____________
NRCS PMS: ________________________________ Date: ____________
ASTCFO: ________________________________ Date: ____________
Other: ________________________________ Date: ____________
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# EVALUATION OF HERBACEOUS FIELD PLANTINGS

**COOPERATOR:** ______________________  **PLANTING NUMBER:** ______________________  **FIELD OFFICE:** ______________________

**EVALUATION DATE:** ______________________  **EVALUATOR(S):** ______________________

**PURPOSE(S):** □ Hay / Pasture Improvement  □ Grazing / Range Improvement  □ Erosion Control  □ Pollinators Species  □ Education  □ Wildlife Cover / Food  □ Saline Area Improvement  □ New Species Testing  □ Restoration

**ANNUAL PRECIPITATION:** □ Below Average  □ Average  □ Above Average  Nearest Inches: ______________________

**Weather Notes:** ________________________________________________________________

**Species Information:** Each column represents a species (write in species at top). Provide species average.

<table>
<thead>
<tr>
<th>Species</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
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</thead>
<tbody>
<tr>
<td>Plants Density (average number of seeded species per square foot)</td>
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<tr>
<td>Canopy Cover (average %)</td>
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<tr>
<td>Height (inches) lush and absolute height / / /</td>
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<tr>
<td>Forage Production (grams dry weight / ft²)</td>
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<tr>
<td>Utilization (%)</td>
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<tr>
<td>Ability to Spread (Yes / No)</td>
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<td></td>
<td></td>
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<tr>
<td>Seed Production (none, sparse, moderate, abundant)</td>
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<tr>
<td>Flower Production (B, %, A)</td>
<td></td>
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<td></td>
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<tr>
<td>Wildlife Use (percent of plants/area with wildlife use sign)</td>
<td></td>
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<tr>
<td>Wildlife Type (species or lifeform using the plantings)</td>
<td></td>
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<tr>
<td>Weed Canopy Cover (0%, 1%, 5%, 10%, 20%, 30%….)</td>
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<tr>
<td>Plant Injury (winter, insect, wildlife pesticide, disease, fire, machine, drought)</td>
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<tr>
<td>Average Injury (Percent of plant affected)</td>
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<tr>
<td>Erosion Control (Rate 1 to 10; 1=obvious loss, 10=stable)</td>
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<tr>
<td>Percent Bare Ground / Litter Cover / / / /</td>
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<tr>
<td>Infiltration 1 = excessive runoff; 3 = some runoff; 5 = no runoff.</td>
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<tr>
<td>Flood / Water Tolerance (NA, strong (10-20 days), moderate (5-10 days), mild (5 days).)</td>
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<tr>
<td>Annual Maintenance (none, mow, spray, pull weeds/grass, fertilize, irrigation, cultivate)</td>
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<tr>
<td>Cooperators Rating:</td>
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</table>
### INSTRUCTIONS: Using a representative area, use the following instructions to evaluate each species.

<table>
<thead>
<tr>
<th>Comments</th>
<th>1.</th>
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<th>3.</th>
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</table>

**Plant Density** is a count of the number of seeded species per square foot. Count grass tillers and forbs by individual plants.

**Canopy Cover** is the percentage of ground covered by the vertical projection of a species / lifeform. Use figures to help in estimating percent canopy cover.

**Height** is measured as the distance from the ground to where stems and leaves intersect (flush height) and the top of inflorescence (absolute height). Collect both.

**Forage Production** is a measure of the yield. Clip all above-ground vegetation by species in a 1 ft\(^2\) area. Clip as close to the ground as possible. Label the paper bag, dry the sample for 48 hours, weigh the sample.

**Utilization** is the percent of current year forage production that is consumed or destroyed by grazing animals.

**Ability to Spread** measures reproductive ability of the species. Are new shoots or new plants establishing in the area. (Yes / No)

**Seed Production** measures reproductive ability of the species. Are seeds present, or is there evidence of production within the evaluation year. (none, sparse = scattered individuals, moderate, abundant = most individual plants)

**Flower Production:** B = before bloom, Percent Bloom: the average percent of developing bloom that have reached open flower stage (10%, 20%, etc.), A = after bloom

**Wildlife Use:** Determine the percent of plants/area used by wildlife. Look for wildlife present as well as signs of use (scat, beds, nests, rubs, burrows, browse, etc.).

**Wildlife Type:** Identify the species or lifeform (birds, small mammals, reptiles) using the plantings.

**Plant Injury:** Has the plant species been injured by winter (kill, frost cracks, sun scald, ice and snow breakage, spring freeze), insects (herbivory, bores, galls), wildlife (rubs, girdling, breakage), pesticide (twisting, bent shoots, discoloration, kill), disease (loss of needles/leaves, discoloration, cankers), fire (burn marks, brown needles), mechanical (mower), drought (rolled or yellow leaves, wilting, scorching, drop leaves early)

**Average Injury:** Of the individual plants affected, what average percent of the plant has impacts.

**Erosion Control:** Wind erosion signs may include scouring (dish or crater like removal of soil), blowouts causing soil loss, deposition of soil, and litter movement. Water erosion signs may include soil and litter movement, litter deposition as a result of flow patterns, rills and gullies, and pedestal of plants. 1 = obvious soil loss, 3 = well defined erosion, 5 = Evidence seen, 7 = few signs, 10 = stable site.

**Percent Bare Ground / Litter Cover:** Records the percent of ground that is bare soil or rocks < an inch in size. Record the percent of the ground covered by vegetative litter that is in contact with the soil. Use figure above for estimating percent cover.

**Infiltration** is a measure of soil physical properties and water cycling. 1 = water ponds 24 hours after rain event, excessive runoff; 3 = water ponds for short periods, some runoff; 5 = no water ponding or runoff.

**Flood / Water Tolerance** rates the species tolerance to intermittent flooding or saturated soils. (NA, strong (10-20 days), moderate (5-10 days), mild (5 days)).

**Annual Maintenance:** Has annual maintenance occurred? (None, mowing, spray, pull weeds/grass, fertilize, irrigation, cultivation)

**Cooperator Rating:** Does the cooperator feel the planting met the objectives?
### EVALUATION OF WOODY FIELD PLANTINGS

**Cooperator:** ___________________  **Planting Number:** __________  **Field Office:** ___________________

**Evaluation Date:** ______________  **Evaluator(s):** ______________________________________________________

**Purpose(s):**
- Windbreak/Shelterbelt
- Erosion Control
- Wildlife
- Pollinators Species
- Aesthetics
- Privacy
- Education

**Annual Precipitation:**
- Below Average
- Average
- Above Average

**Nearest Inches:** ___________________

**Weather Notes:** ______________________________________________________________________

**Species Information:** Each column represents a species (write in species at top). Provide the average by species.

<table>
<thead>
<tr>
<th>Species</th>
<th>1.</th>
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<th>3.</th>
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<tbody>
<tr>
<td><strong>Number Planted / Number Alive</strong></td>
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<tr>
<td><strong>Height (Feet)</strong></td>
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<tr>
<td><strong>Crown Width (Feet)</strong></td>
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<tr>
<td><strong>Diameter at Breast Height (DBH Inches)</strong></td>
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<tr>
<td><strong>Plant-to-Plant Variability</strong> (10%, 20%, 30%.... 90%, 100%)</td>
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<tr>
<td><strong>Branching / Porosity</strong> (Sparse &lt;40%, Moderate 50%, Dense &gt;60%)</td>
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<tr>
<td><strong>Ability to Spread</strong> (Yes / No)</td>
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<tr>
<td><strong>Fruit Production</strong> (none, sparse, moderate, abundant)</td>
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<tr>
<td><strong>Wildlife Use</strong> (percent of plants/area with wildlife use sign)</td>
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<tr>
<td><strong>Wildlife Type</strong> (species or lifeform using the plantings)</td>
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<tr>
<td><strong>Light Conditions</strong> (sun, part sun/shade, shade)</td>
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<tr>
<td><strong>Plant Injury</strong> (winter, insect, wildlife pesticide, disease, fire, machine, drought)</td>
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<tr>
<td><strong>Average Injury</strong> (Percent of plant affected)</td>
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<td><strong>Flood / Water Tolerance</strong> (NA, strong (10-20 days), moderate (5-10 days), mild (5 days).)</td>
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<tr>
<td><strong>Weed Canopy Cover</strong> (0%, 1%, 5%, 10%, 20%, 30%....)</td>
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<tr>
<td><strong>Grass Canopy Cover</strong> (0%, 1%, 5%, 10%, 20%, 30%....)</td>
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<tr>
<td><strong>Plant Protection Condition</strong> (good, fair, poor)</td>
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<tr>
<td><strong>Annual Maintenance</strong> (none, mow, spray, pull weeds/grass, fertilize, irrigation, cultivate)</td>
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<tr>
<td><strong>Cooperators Rating:</strong></td>
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</table>
INSTRUCTIONS: Using a representative area of the planting, use the following instructions to evaluate each species.

**Height**: is the distance from the ground to the terminal branch. Average for each species.

**Crown Width**: is the average horizontal width of the crown (foliage and branches growing outward from the trunk of the tree or center of shrub). Average for each species.

**Diameter at Breast Height**: is the diameter (inches) of the tree trunk at 4.5 feet above the ground level.

**Plant-to-Plant Variability**: is a measure of how uniform in height, width, and condition the plants within a species are over time. Of the number planted, what percent are uniform? 10%, 20%, 30%, etc.

**Branching / Porosity**: is a parameter for measuring plant canopy density (i.e. how will it control wind erosion). Select an average section of the windbreak/planting, look perpendicular to the woody plants, using the sky as a white background, and estimate the amount of space filled by branches. (Sparse <40%, Moderate 40-60%, Dense >60%)

**Ability to Spread**: measures reproductive ability of the species. Are new shoots or new plants establishing in the area. (Yes / No)

**Fruit Production**: measures reproductive ability of the species. Are fruits currently present, or is there evidence of production within the evaluation year. (none, sparse = scattered individuals, moderate, abundant = most plants)

**Wildlife Use**: Determine the percent of plants/area used by wildlife. Look for wildlife present as well as signs of use (scat, beds, nests, rubs, burrows, browse, etc.).

**Wildlife Type**: Identify the species or lifeform (birds, small mammals, reptiles) using the plantings.

**Light Conditions**: Is the species in full sun, partial sun/shade, or full shade. Shade conditions may change with time of day.

**Plant Injury**: Has the plant species been injured by winter (kill, frost cracks, sun scald, ice and snow breakage, spring freeze), insects (herbivory, bores, galls), wildlife (rubs, girdling, breakage), pesticide (twisting, bent shoots, discoloration, kill), disease (loss of needles/leaves, discoloration, cankers), fire (burn marks, brown needles), mechanical (mower), drought (rolled or yellow leaves, wilting, scorching, drop leaves early)

**Average Injury**: Of the individual plants affected, what average percent of the plant has impacts.

**Erosion Control**: Wind erosion signs may include scouring (dish or crater like removal of soil), blowouts causing soil loss, deposition of soil, and litter movement. Water erosion signs may include soil and litter movement, litter deposition as a result of flow patterns, rills and gullies, and pedestaling of plants. 1 = obvious soil loss, 3=well defined erosion, 5= Evidence seen, 7=few signs, 10=stable site.

**Flood / Water Tolerance**: rates the species tolerance to intermittent flooding or saturated soils. (NA, strong (10-20 days), moderate (5-10 days), mild (5 days).

**Weed and Grass Canopy Cover**: is the percentage of ground covered by the vertical projection of a species / lifeform.

**Plant Protection Condition**: Are the plant protectors (mulch, fabric, mats, protector tubes) in good, fair, or poor condition?

**Annual Maintenance**: Has annual maintenance occurred?

**Cooperator Rating**: Does the cooperator feel the planting met the objectives?